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John W. Flannagan Reservoir 2018 Fisheries Management Report

Flannagan Reservoir is a 1,143-acre impoundment located in Dickenson County. The reservoir was built to provide flood control, fish and wildlife habitat and recreational opportunities. The U.S. Army Corps of Engineers completed construction of the dam and project in 1964. Fifty miles of beautiful shoreline consisting of mature hardwood forest interspersed with spectacular rock bluffs surround this deep, clear reservoir. At full pool elevation of 1,396 feet above sea level, the lake has a maximum depth of 166 feet and an average depth of 58 feet. The lake level fluctuates about 16 feet in a normal water year. The lake is drawn down to winter pool during October and November, and is typically returned to summer pool in April.

Flannagan Reservoir is home to a variety of sport fish species including: largemouth and smallmouth bass, walleye, hybrid striped bass, channel catfish, flathead catfish, crappie, bluegill, rock bass, common carp and musky. Alewives and gizzard shad provide forage for the sportfish populations. Most of these populations are self-sustaining and do not require maintenance stockings.

The overall fisheries management goal for Flannagan Reservoir is to provide quality angling opportunities for a diversity of fish species. In order to provide quality fishing opportunities, fish populations need to offer both abundance and good size structure. Abundance is measured in terms of how many fish are collected per hour of electrofishing or per net night of sampling. Size structure is measured by looking at the proportion of adult fish in the sample that are larger than a given size. For example, we consider the proportion of adult largemouth bass larger than 15 inches, or the proportion of adult black crappie that are over 10 inches. Catch rates and size structure data provide a standardized means of comparing this year's fish sample to last year's catch, as well as to the samples collected at other lakes. Catch rates do not represent the number of fish you might catch while fishing, because you may be more or less effective than the sampling gear. Size structure measures give information about the sizes of fish available in the population.

Stocking

Flannagan Reservoir is currently managed as a priority walleye water with the goal of maintaining an exceptional walleye population. As a priority walleye water, the lake receives annual stockings of walleye fry at a rate of approximately 100 fry per acre. In 2017, Flannagan Reservoir received 116,326 walleye fry. The lake received about 11,000

black crappie fingerlings in summer 2017. Nearly 17,200 hybrid striped bass fingerlings were released into Flannagan Reservoir in August 2017.

Regulations

Species	Length Limit	Creel Limit
Bass (largemouth and smallmouth)	12-inch minimum	5 per day combined
Sunfish (all species combined)	none	50 per day
Crappie	10-inch minimum	25 per day
Walleye	18-inch minimum	5 per day
Hybrid striped bass	20-inch minimum	4 per day
Catfish (channel and flathead combined)	none	20 per day
Muskellunge	30-inch minimum	2 per day

Population Sampling

Black Bass

Largemouth bass was the most abundant species in the 2017 spring electrofishing sample. Over 200 largemouth bass were sampled resulting in a catch rate of 46 fish/h. This was significantly higher than the catch rate in 2016 (33 fish/h) and was comparable to the average catch rate from the preceding eleven years (48 fish/h). The catch rate for largemouth bass was highest in the Pound River arm (58 fish/h) of the lake followed by the Cranesnest River arm (48 fish/h). Both of these were significantly higher than that observed in the main (lower) portion of the lake (23 fish/h).

Largemouth bass sampled in 2017 ranged in length from 5 – 21 inches with an average length of 13.6 inches (Figure 2). Eighty percent of adult largemouth bass were ≥ 12 in and 35% exceeded 15 inches. Fish ≥ 20 inches accounted for 1% of the sample. Although no trophy-size largemouth bass were collected, the sample suggests that there are good numbers of harvestable-size fish (≥ 12 in) available to anglers. However, the abundance of fish exceeding the 12-inch minimum length limit for largemouth bass suggests that harvest of legal-size fish is

low. This is supported by the results of the 2016 creel survey in which anglers voluntarily released 88% of the legally harvestable largemouth bass caught.

In 2016, a subsample of largemouth bass was retained during the spring electrofishing sample for age and growth analysis. The results from this analysis were not available for the last report and so are presented here. Estimated ages for largemouth bass in Flannagan Reservoir ranged from 1 to 15. The growth curve developed from this data suggests that it takes approximately 2.8 years for a largemouth bass in Flannagan Reservoir to reach the 12-inch minimum length limit (Figure 3). By age six, a largemouth bass has grown to about 16 inches in length.

In addition to providing insight on growth rates, age data can provide important information on annual survival and mortality rates affecting a fish population. By plotting the numbers of fish of various ages collected in a sample against the respective ages, one can determine the rate at which fish die in a population (i.e. mortality rate). This is known as catch-curve analysis. Figure 4 depicts the catch-curve regression for largemouth bass collected in 2016 from Flannagan Reservoir. The results of this analysis suggest an annual mortality rate of 27% for the largemouth bass population. This annual mortality rate is relatively low and is comparable to that observed in most Virginia largemouth bass populations. Total annual mortality can be further divided into natural mortality and fishing mortality. Natural mortality is that which can be attributed to factors such old age, predation, diseases, and parasites while fishing mortality results from removal of fish from the population through angler harvest. Without additional information, such as that obtained from a tagging study, it is difficult to partition the total annual mortality rate of 27% into fishing and natural mortality. However, the low estimated total annual mortality rate and the high relative abundance of largemouth bass exceeding the 12-inch minimum length limit suggest that fishing mortality is likely low.

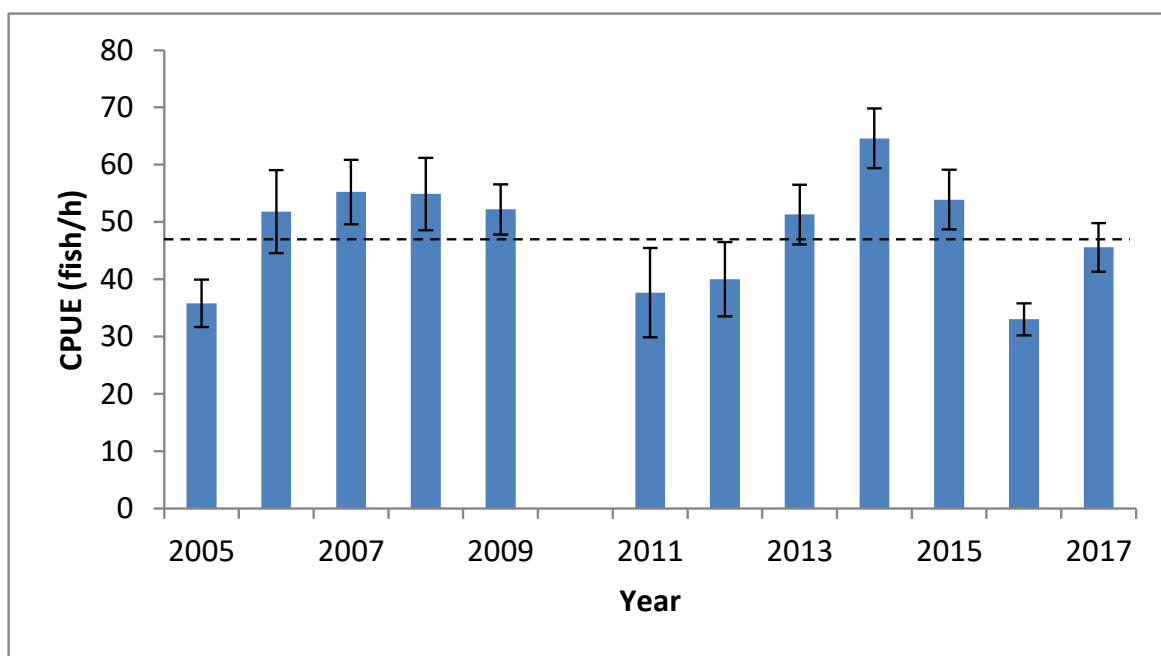


Figure 1. Number of largemouth bass collected per hour of electrofishing in Flannagan Reservoir annually from 2005-2017. Error bars indicate standard error. Dashed line indicates average catch rate for samples 2005-2016. The lake was not sampled in 2010.

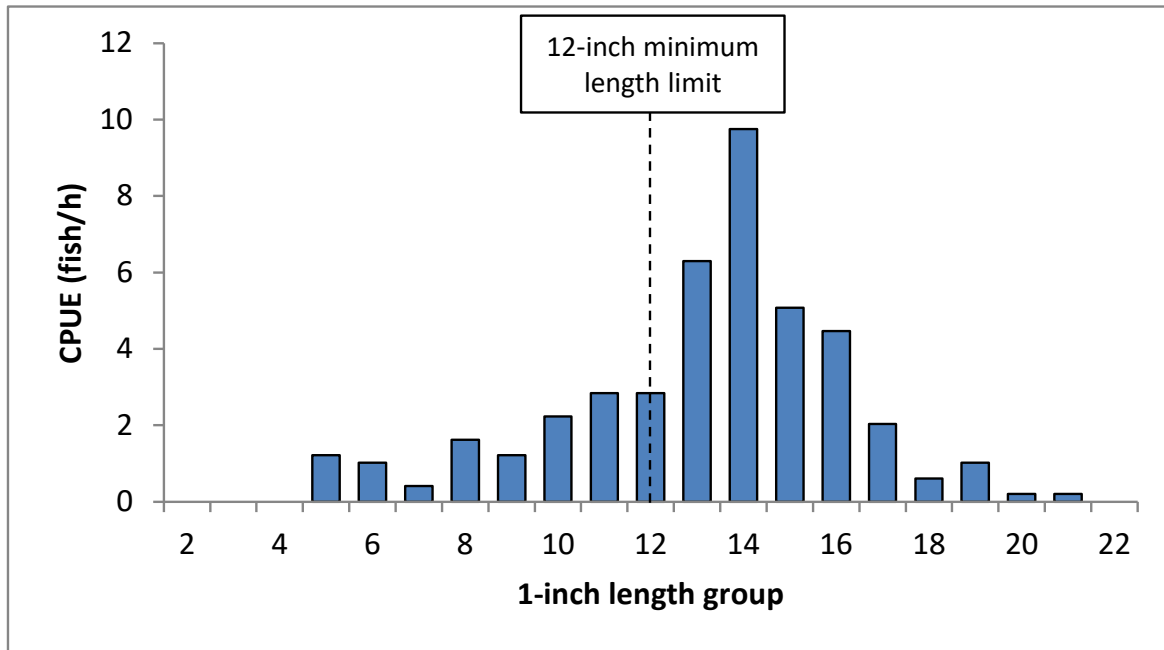


Figure 2. Length frequency distribution of largemouth bass collected from Flannagan Reservoir during electrofishing samples in spring 2017.

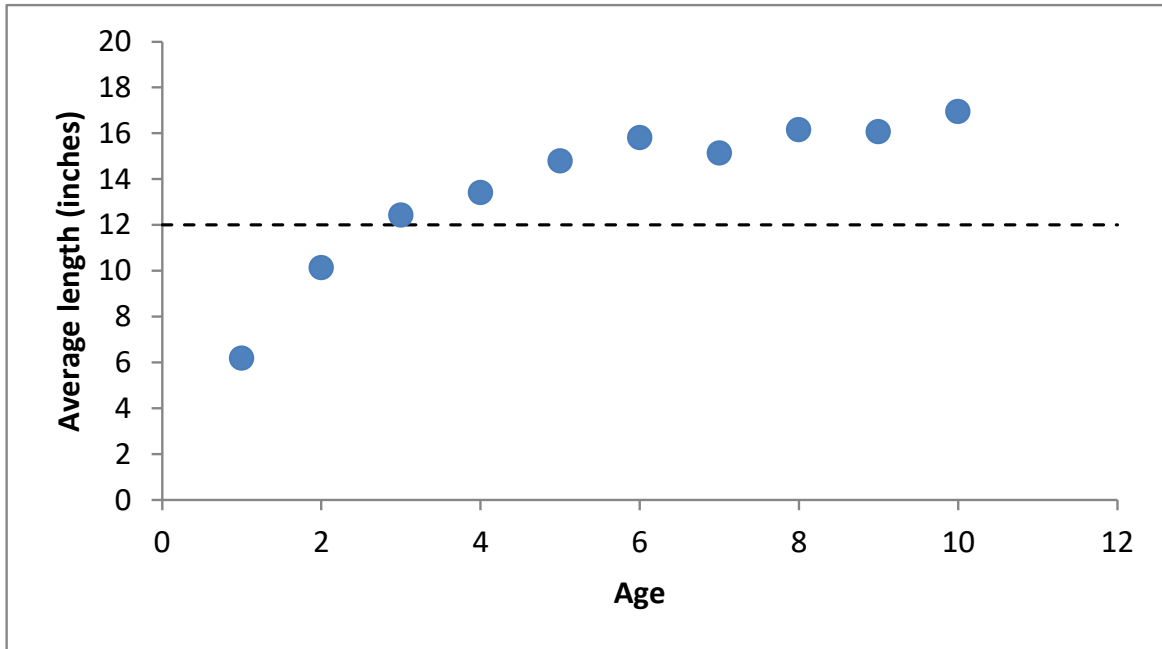


Figure 3. Average length-at-age of largemouth bass collected from Flannagan Reservoir in 2016. Average lengths for ages 11 through 15 not shown due to low sample size. Dashed, horizontal line represents the 12-inch minimum length limit in place for this species.

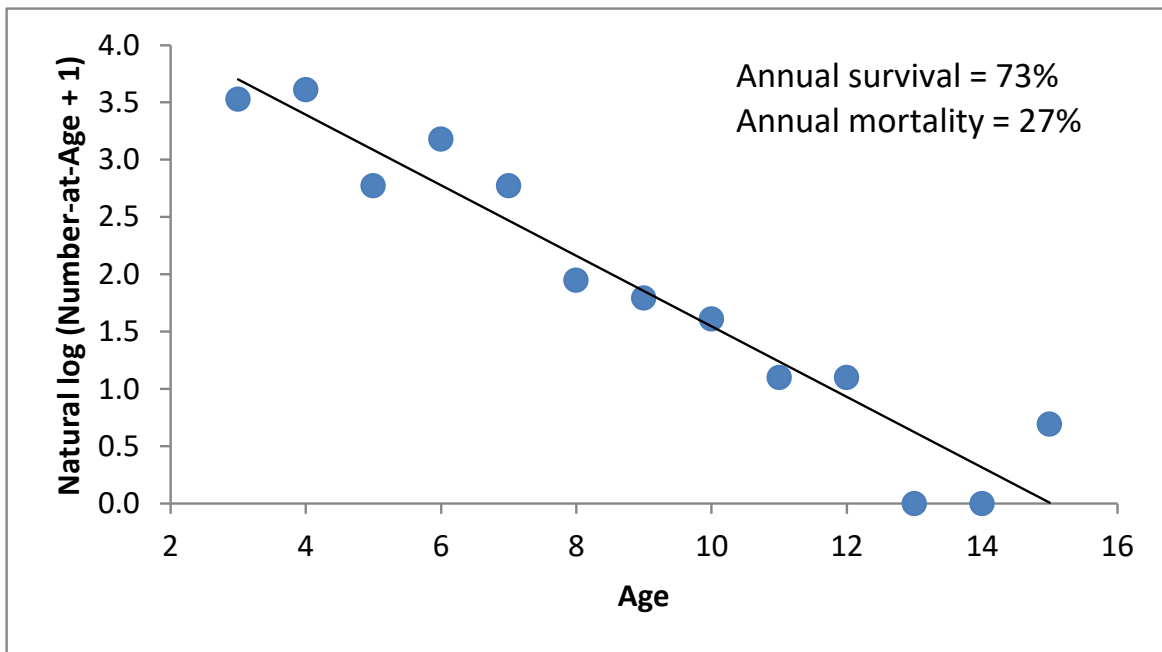


Figure 4. Catch-curve regression for largemouth bass (Ages 3 – 15) collected from Flannagan Reservoir in 2016. Age-1 and Age-2 fish were not included in the analysis due to incomplete recruitment to sampling gear.

Walleye/Saugeye

Spring electrofishing – In the 2017 spring sample, walleye and saugeye were collected at a combined rate of about 11 fish/hour, which exceeds the 10 fish/h management objective for

VDGIF's priority walleye waters. Walleye sampled in spring 2017 ranged in length from 13-25 inches with 22% exceeding the 18-inch minimum length limit. Saugeye ranged in length from 15-20 inches with 41% exceeding 18 inches.

Fall gill netting - The catch rate for walleye and saugeye in the 2017 fall gill netting sample (7 fish/net night) was down slightly from the catch rate observed in 2016 (9 fish/net night). Walleye ranged in length from 15 - 23 inches while saugeye measured from 16 – 22 inches (Figure 5). Walleye from the 2014 stocking cohort (Age-3) accounted for nearly half (48%) of the walleye/saugeye sample. Saugeye stocked in 2013 (Age-4) accounted for 26% of the sample. Few fish older than Age-4 were collected in the samples, which is characteristic of walleye fisheries where exploitation is high.

Exploitation Study - The tagging study initiated in February 2016 has provided valuable insights on the level of catch and harvest for walleye and saugeye fisheries in Flannagan Reservoir. A total of 159 walleye and saugeye were tagged in February-May 2017. Most (77%) of the fish tagged were walleye. Although fish of all sizes were tagged, 34% of the walleye exceeded the 18-inch minimum length limit while 73% of the saugeye tagged exceeded the length limit. Of the legal-sized fish tagged, an estimated 11% (walleye and saugeye combined) have been harvested by anglers after adjusting for tag loss and angler reporting. This exploitation rate is much lower than that observed in 2016 (46%). Anglers reported difficulty in catching walleye/saugeye during the 2017 fishing season and may help to explain the lower estimated exploitation.

The exploitation study on Flannagan Reservoir will continue in 2018, with tagging scheduled to begin in March. Conducting the study over multiple years will allow VDGIF biologists to assess inter-annual variation in exploitation levels. Anglers catching tagged fish are asked to return the tag to VDGIF along with basic catch information and will receive a \$20 reward for doing so.

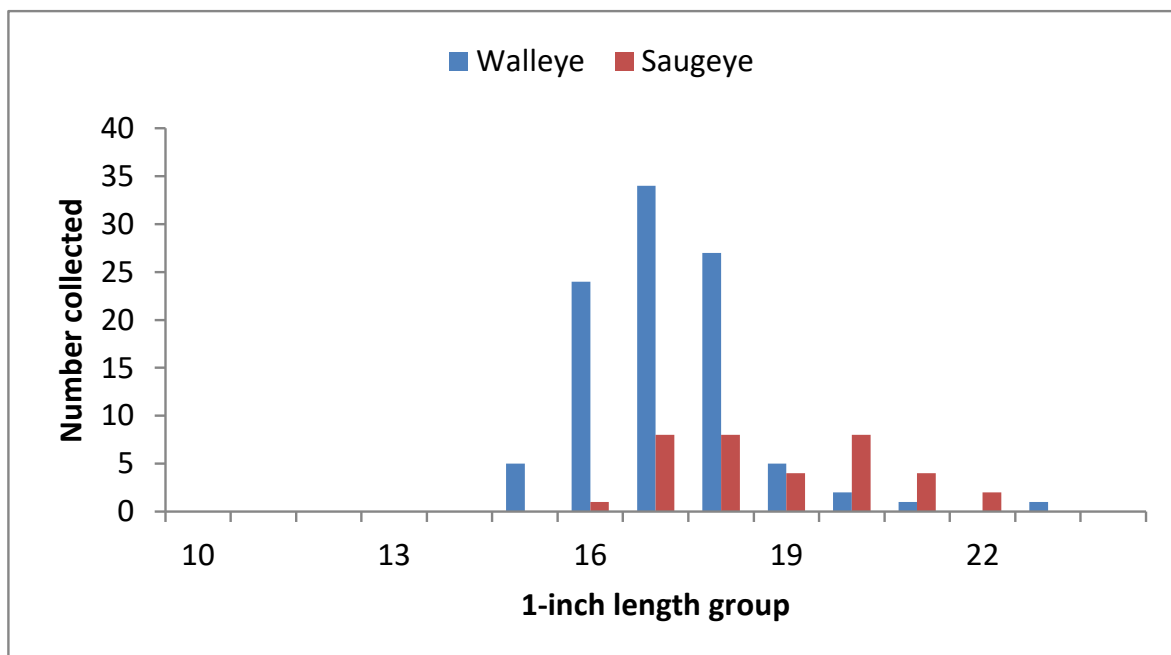


Figure 5. Length frequency distribution of walleye and saugeye collected from Flannagan Reservoir during gill net samples in fall 2017.

Hybrid Striped Bass

Hybrid striped bass were first stocked into Flannagan Reservoir in 1999 and the hybrid fishery has become quite popular. Hybrids are stocked each year in July or August as fingerlings (two to four inches in length). Hybrid striped bass growth rates are good in Flannagan. They measure eight to ten inches or more after one year in the reservoir, and reach 14 to 16 inches by the end of their second growing season (1.5 years old). Most two year old hybrids are about 18 inches in length. Hybrids generally reach 20 to 22 inches in total length during their third year. At age four, hybrids are about 24 to 25 inches long. Growth slows at this length.

The relative abundance of hybrid striped bass observed in the 2017 gill net sample (3 fish/net night) was down from that observed in 2016 (7 fish/net night). Hybrid striped bass in 2017 averaged 20 inches in length and ranged in length from 11 – 26 inches (Figure 6).

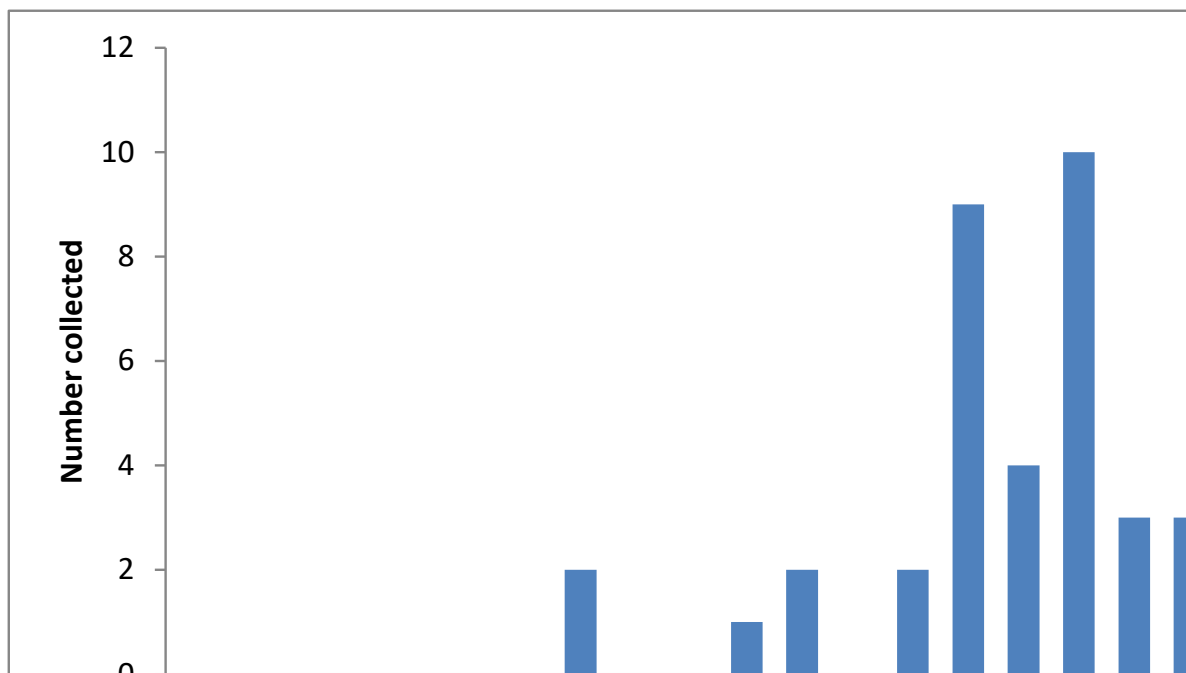


Figure 6. Length frequency distribution of hybrid striped bass collected from Flannagan Reservoir during gill net samples in fall 2017.

Crappie

Since 1998, one fisheries management goal has been to re-establish the black crappie population in Flannagan Reservoir. Biologists have used a variety of strategies to

accomplish this task. The annual stocking of about 1,000 adult black crappie (6 to 8 inches) from 1998 to 2002 was the first step toward recovery. Habitat enhancement has also played a vital role in the effort. A 10-inch minimum length limit was also established to allow crappie an opportunity to spawn for a couple of seasons before being legal for harvest.

The relative abundance of crappie populations varies considerably from year to year and crappie are often characterized as having “boom and bust” cycles of abundance. This variability in abundance is generally the result of inconsistent spawning success. When the crappie population has a really good spawn, that year class of fish will increase the population abundance and provide good fishing for several years. Poor spawning success creates missing year classes that have the opposite effect. The black crappie population in Flannagan may be coming off of a “boom” period as indicated by a spring 2017 electrofishing catch rate of 2 fish/hr (Figure 7). This represents a continued decline from previous years. Sixty-two percent of the adult black crappie sampled exceeded the 10-inch minimum length limit for this species and 50% were ≥ 12 inches. So although overall numbers of crappie are down, the current population is providing opportunities for anglers to harvest crappie.

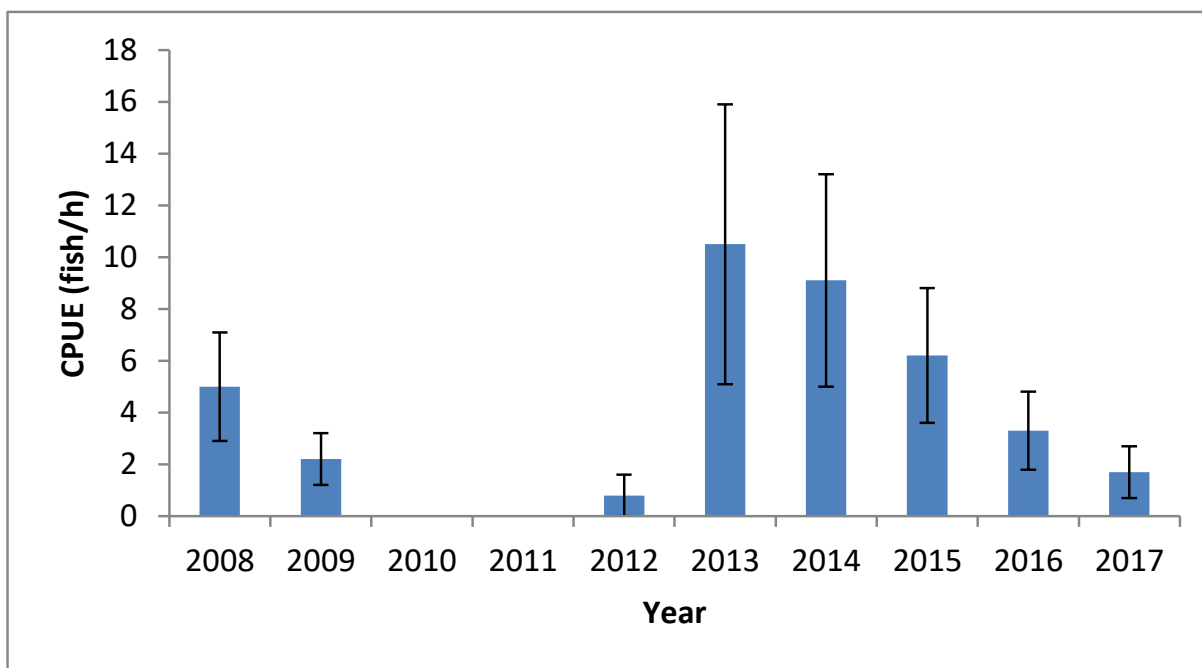


Figure 7. Number of black crappie collected per hour of electrofishing in Flannagan Reservoir annually from 2008-2017. Error bars indicate standard error. The lake was not sampled in 2010.

Other species

Flannagan also offers some very good fishing for bluegills. Population sampling yielded high numbers and sizes of bluegills. Anglers frequently report catching very nice bluegill and redear sunfish. George Mullins of Haysi landed a yellow perch on March 8, 2010 that established a new Virginia state record. The record yellow perch weighed 3 pounds even. No yellow perch have been collected by biologists during population sampling, but the rumor is that some yellow perch were caught in another lake and moved to Flannagan by anglers. So, there may be a few more huge yellow perch out there for the angler in the right place at the right time. Please remember that moving fish from one lake to another is not a good practice. Stocking fish can have undesirable effects on the existing fish populations through predation, competition or diseases introduction. Stocking fish into a public lake or any stream without a written authorization from the Department of Game and Inland Fisheries is also **ILLEGAL**.

Channel and flathead catfish populations provide good fishing opportunities as well. Again, samples yield mostly “average size” catfish, whereas anglers often catch trophy cats. Some huge carp also roam Flannagan’s clear waters, just waiting to test an angler’s skills and equipment.

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